

List of All Chemicals

P Paullinia cupana (Sapindaceae)

Common name(s)

Guarana

How used

Food

*Unless otherwise noted all references are to Duke, James A. 1992. Handbook of phytochemical constituents of GRAS herbs and other economic plants. Boca Raton, FL. CRC Press.

Chemical	Part	Low PPM	High PPM	StdDev	*Reference
ADENINE	Seed	--	--		Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.
Activities (11)					
Antianemic 1.5 g/day	Martindale's 28th				
Antigranulocytopenic					
Antiviral					
CNS-Stimulant					
Diuretic					
Hyperuricemic	Martindale's 28th				
Insectifuge	Tunon, H., Thorsell, W., and Bohlin, L. 1993. Mosquito Repelling Activity of Compounds Occurring in Achillea millefolium L. (Asteraceae). Economic Botany 48(2): 111-120, 1994.				
Lithogenic					
Myocardiotonic					
Pesticide					
Vasodilator					
ASH	Seed	--	14200.0	-1.01	Abstract (See species file)
CAFFEINE	Seed	9100.0	76000.0	2.16	*
Activities (62)					
(+)-Inotropic	Bruneton, J. 1999. Pharmacognosy, Phytochemistry, Medicinal Plants. 2nd Ed. Lavoisier Publishing, Paris. 1119 pp.				
Adenosine-Antagonist	McKenna, D. J., Hughes, K., and Jones, K. 2000. Green Tea Monograph. Alternative Therapies, 6(3): 61-82.				
Analепtic 200 scumus	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. Drug Dosage in Laboratory Animals: A Handbook. (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.				
Analgesic-Synergist					
Antiapneic	Martindale's 29th				
Antiapoptotic					
Antiasthmatic 5-10 mg/kg orl/man	Martindale's 29th				
Anticarcinogenic					
Anticariogenic					
Antidermatitic	Martindale's 29th				
Antiemetic	Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.				
Antifeedant	Jacobson, M., Glossary of Plant-Derived Insect Deterrents, CRC Press, Inc., Boca Raton, FL, 213 p, 1990.				
Antiflu	Economic & Medicinal Plant Research, 5: 198.				
Antiherpetic					
Antihypotensive 250 mg/day/orl/man	Martindale's 29th				
Antinarcotic	Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.				
Antiobesity					
Antioxidant					
Antirhinitic 140 mg/day/orl/man	Martindale's 29th				
Antiserotonergic 40 ipr rat	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. Drug Dosage in Laboratory Animals: A Handbook. (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.				
Antiserotonergic 40 scu rat	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. Drug Dosage in Laboratory Animals: A Handbook. (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.				
Antitumor					
Antitumor (Lung)					

Antivaccinia	
Antiviral	Vlietinck, A.J. and Dommisse, R.A. eds. 1985. Advances in Medicinal Plant Research. Wiss. Verlag. Stuttgart.
Apoptotic	
Arrhythmicogenic 1,500 mg/man	
CNS-Stimulant 100 orl mus	
CNS-Stimulant 30 orl rat	
Cancer-Preventive	Stitt, P. A. Why George Should Eat Broccoli. Dougherty Co, Milwaukee, WI, 1990, 399 pp.
Cardiotonic 10-25 orl dog	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. Drug Dosage in Laboratory Animals: A Handbook. (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.
Cardiotonic 65-500 orl cat	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. Drug Dosage in Laboratory Animals: A Handbook. (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.
Catabolic	Abstract (See species file)
Choleretic	
Coronary-Dilator	McKenna, D. J., Hughes, K., and Jones, K. 2000. Green Tea Monograph. Alternative Therapies, 6(3): 61-82.
Diuretic	
Energizer 20-200 mg/man	
Ergotamine-Enhancer	Martindale's 29th
FLavor FEMA 125	Aloe Research Council - Duke writeup of non-peer reviewd book by Coats and draft by Henry
Herbicide	
Hypertensive	
Hypoglycemic	
Insecticide	Jacobson, M., Glossary of Plant-Derived Insect Deterrents, CRC Press, Inc., Boca Raton, FL, 213 p, 1990.
Lypolytic	Bruneton, J. 1999. Pharmacognosy, Phytochemistry, Medicinal Plants. 2nd Ed. Lavoisier Publishing, Paris. 1119 pp.
Myorelaxant	McKenna, D. J., Hughes, K., and Jones, K. 2000. Green Tea Monograph. Alternative Therapies, 6(3): 61-82.
Neurotoxic	R.J. Hixtable (Huxtable, R.J. (as T. Max). 1992. This and That:The Essential Pharmacology of Herbs and Spices. Tips 13:15-20 Huxtable, R.J. 1992b. The Myth of Benfient Nature. The Risk of Herbal Preparations. Anns. Intern. Med. 117(2):165-6; Huxtable, R.
Pesticide	
Phosphodiesterase-Inhibitor	
Pyrogenic 60 mg/day oral hm	Daroca, P., Rodriguez, J., Reano, M., Canto, G., Miranda, P. 1996. Fever From Caffeine. Allergy, 51(3): 189-191.
Pyrogenic 13.3 mg/kg ipr rbt	Dascombe, M. J. 1977. Effects of Methylxanthine Drugs on Pyrogen-Induced Hyperthermia. Eur J Pharmacol, 45: 389-392.
Pyrogenic 15 mg/kg ipr cat	Dascombe, M. J. 1977. Effects of Methylxanthine Drugs on Pyrogen-Induced Hyperthermia. Eur J Pharmacol, 45: 389-392.
Respirastimulant	
Spasmogenic 1,500 mg/man	
Stimulant	R.J. Hixtable (Huxtable, R.J. (as T. Max). 1992. This and That:The Essential Pharmacology of Herbs and Spices. Tips 13:15-20 Huxtable, R.J. 1992b. The Myth of Benfient Nature. The Risk of Herbal Preparations. Anns. Intern. Med. 117(2):165-6; Huxtable, R.
Tachycardic 1,500 mg/man	
Teratogenic 14 orl rat	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. Drug Dosage in Laboratory Animals: A Handbook. (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.
Topoisomerase-I-Inhibitor 0.1 nM	Tohda, H., Zhao, J. H., Oikawa, A. 1992. A Possible Involvement of DNA Topoisomerase I in 'Caffeine Effect' After Ultraviolet Irradiation. Tohoku J Exp Med, 168: 129-132.
Topoisomerase-I-Inhibitor 75 uM	Shin, C. G., Strayer, J. M., Wani, M., Snapka, R. M. 1990. Rapid Evaluation of Topoisomerase Inhibitors: Caffeine Inhibition of Topoisomerases in vivo. Teratogen Carcinogen Mutagen, 10: 41-52.
Topoisomerase-II-Inhibitor 99 mM	Shin, C. G., Strayer, J. M., Wani, M., Snapka, R. M. 1990. Rapid Evaluation of Topoisomerase Inhibitors: Caffeine Inhibition of Topoisomerases in vivo. Teratogen Carcinogen Mutagen, 10: 41-52.
Vasodilator	Bruneton, J. 1999. Pharmacognosy, Phytochemistry, Medicinal Plants. 2nd Ed. Lavoisier Publishing, Paris. 1119 pp.
cAMP- Phosphodiesterase-Inhibitor	Pizzorno, J.E. and Murray, M.T. 1985. A Textbook of Natural Medicine. John Bastyr College Publications, Seattle, Washington (Looseleaf).
cGMP- Phosphodiesterase-Inhibitor	Pizzorno, J.E. and Murray, M.T. 1985. A Textbook of Natural Medicine. John Bastyr College Publications, Seattle, Washington (Looseleaf).

CAFFEINE Plant -- 25000.0 *

Activities (62)

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Adenosine-Antagonist	McKenna, D. J., Hughes, K., and Jones, K. 2000. Green Tea Monograph. Alternative Therapies, 6(3): 61-82.
Analeptic 200 scu mus	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. Drug Dosage in Laboratory Animals: A Handbook. (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.
Analgesic-Synergist	
Antiapneic	Martindale's 29th
Antiapoptotic	
Antiasthmatic 5-10 mg/kg orl/man	Martindale's 29th
Anticarcinogenic	
Anticariogenic	
Antidermatitic	Martindale's 29th

Antiemetic	Williamson, E. M. and Evans, F. J., <i>Potter's New Cyclopaedia of Botanical Drugs and Preparations</i> , Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.
Antifeedant	Jacobson, M., <i>Glossary of Plant-Derived Insect Deterrents</i> , CRC Press, Inc., Boca Raton, FL, 213 p, 1990.
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Antioxidant	
Antirhinitic 140 mg/day/orl/man	Martindale's 29th
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Antitumor	
Antitumor (Lung)	
Antivaccinia	Vlietinck, A.J. and Dommisse, R.A. eds. 1985. <i>Advances in Medicinal Plant Research</i> . Wiss. Verlag. Stuttgart.
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CNS-Stimulant 30 orl rat	
Cancer-Preventive	Stitt, P. A. <i>Why George Should Eat Broccoli</i> . Dougherty Co, Milwaukee, WI, 1990, 399 pp.
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Coronary-Dilator	McKenna, D. J., Hughes, K., and Jones, K. 2000. <i>Green Tea Monograph</i> . Alternative Therapies, 6(3): 61-82.
Diuretic	
Energizer 20-200 mg/man	
Ergotamine- Enhancer	Martindale's 29th
FLavor FEMA 125	Aloe Research Council - Duke writeup of non-peer reviewd book by Coats and draft by Henry
Herbicide	
Hypertensive	
Hypoglycemic	
Insecticide	Jacobson, M., <i>Glossary of Plant-Derived Insect Deterrents</i> , CRC Press, Inc., Boca Raton, FL, 213 p, 1990.
Lypolytic	Bruneton, J. 1999. <i>Pharmacognosy, Phytochemistry, Medicinal Plants</i> . 2nd Ed. Lavoisier Publishing, Paris. 1119 pp.
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Pesticide	
Phosphodiesterase- Inhibitor	
Pyrogenic 60 mg/day oral hmn	Daroca, P., Rodriguez, J., Reano, M., Canto, G., Miranda, P. 1996. <i>Fever From Caffeine</i> . Allergy, 51(3): 189-191.
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Pyrogenic 15 mg/kg ipr cat	Dascombe, M. J. 1977. Effects of Methylxanthine Drugs on Pyrogen-Induced Hyperthermia. <i>Eur J Pharmacol</i> , 45: 389-392.
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cGMP- Phosphodiesterase- Inhibitor	Pizzorno, J.E. and Murray, M.T. 1985. <i>A Textbook of Natural Medicine</i> . John Bastyr College Publications, Seattle, Washington (Looseleaf).

CATECHOL	Seed	--	--	*
Activities (22)				
Allelochemical IC50=0.65 mM	Lydon, J. & Duke, S., The potential of pesticides from plants, pp. 1-41 in Craker, L. & Simon, J., eds, Herbs, Spices & Medicinal Plants: Recent Advances in Botany, Horticulture, & Pharmacology, v. 4, Oryx Press, Phoenix, 1989, 267pp.			
Allergenic	Mitchell, J. and Rook, A.J. 1923. Botanical Dermatology: plants and plant products injurious to the skin. Vancouver: Greengrass, 1979. xiii, 787 p.: ill.			
Anticancer (Breast)	Madhavi, D. L., Bomser, J., Smith, M., Singletary, K. 1998. Isolation of Bioactive Constituents from Vaccinium myrtillus (Bilberry) Fruits and Cell Cultures. <i>Plant Sci.</i> , 131(1): 95-103.			
Antigonadotropic				
Antioxidant	Jim Duke's personal files.			
Antiseptic				
Antistomatomic	Economic & Medicinal Plant Research, 5: 197.			
Antithiamin	Phenolic Compounds in Food and Their Effects on Health, 69.			
Antithyrotropic				
Antitumor				
Antitumor (Breast)	Madhavi, D. L., Bomser, J., Smith, M., Singletary, K. 1998. Isolation of Bioactive Constituents from Vaccinium myrtillus (Bilberry) Fruits and Cell Cultures. <i>Plant Sci.</i> , 131(1): 95-103.			
Antiviral	Economic & Medicinal Plant Research, 5: 197.			
Cancer- Preventive				
Carcinogenic 0.8% diet	Jim Duke's personal files.			
Carcinogenic 2% diet				
Co-carcinogenic				
Convulsant	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.			
Dermatitigenic	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.			
Herbicide				
Pesticide				
Quinone- Reductase- Inducer	Madhavi, D. L., Bomser, J., Smith, M., Singletary, K. 1998. Isolation of Bioactive Constituents from Vaccinium myrtillus (Bilberry) Fruits and Cell Cultures. <i>Plant Sci.</i> , 131(1): 95-103.			
Tumor-Promoter <0.2% diet	Jim Duke's personal files.			
CATECHUTANNIC- ACID	Seed	--	--	CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
CHOLINE	Seed	--	--	CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
Activities (20)				
Antialzheimeran 5-16 g/man/day				
Antichoreic	Davies, S., and Stewart, A. 1990. Nutritional Medicine. Avon Books, New York. 509pp.			
Anticirrhotic 6,000 mg/man/day				
Anticystinuric				
Antidementia				
Antidiabetic				
Antidyskinetic 150-200 mg/kg/man/day	Martindale's 28th			
Antihomocysteine				
Antimanic 15-30 g/man/day/orl	Pizzorno, J.E. and Murray, M.T. 1985. A Textbook of Natural Medicine. John Bastyr College Publications, Seattle, Washington (Looseleaf).			
Antinociceptive				
Antisteatotic				
Cardiodepressant				
Cerebrotonic				
Cholinergic	Newall, C. A., Anderson, L. A. and Phillipson, J. D. 1996. Herbal Medicine - A Guide for Health-care Professionals. The Pharmaceutical Press, London. 296pp.			
Hepatoprotective				
Hypotensive				
Ileorelaxant				
Lipotropic				
Memorigenic				
Parasympathomimetic (1/1,000th acetylcholine)	Neuwinger, H. D. 1996. African Ethnobotany - Poisons and Drugs. Chapman & Hall, New York. 941 pp.			
D-CATECHIN	Seed	--	--	Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.

Activities (4)

Anticoagulant					
Cancer-Preventive	Stitt, P. A. Why George Should Eat Broccoli. Dougherty Co, Milwaukee, WI, 1990, 399 pp.				
Cardiotonic					
Vasoconstrictor	Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.				
FAT	Seed	--	30000.0	-1.24	Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.
GUANINE	Seed	--	--		Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.

Activities (1)

Essential Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.

GUARANINE	Seed	--	--		CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
HYPOXANTHINE	Seed	--	--		CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
MUCILAGE	Seed	--	--		CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses

Activities (3)

Cancer-Preventive	Stitt, P. A. Why George Should Eat Broccoli. Dougherty Co, Milwaukee, WI, 1990, 399 pp.
Demulcent	
Hypocholesterolemic	

PROTEIN	Seed	--	98600.0	-1.2	Abstract (See species file)
RESIN	Seed	--	70000.0	-0.34	Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.
SAPONIN	Seed	--	--		*
SAPONINS	Seed	--	--		Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.

Activities (5)

Antihepatotoxic	
Antimutagenic	
Antitumor (Lung)	
Antitumor (Ovary)	
Immunomodulator	

STARCH	Seed	50000.0	60000.0	-1.01	Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.
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Activities (5)

Absorbent	Martindale's 29th
Antidote (Iodine)	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
Antinesidioblastosic	Martindale's 29th
Emollient	Martindale's 29th
Poultice	Martindale's 29th

TANNIN	Seed	50000.0	120000.0	0.5	*
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Activities (35)

Anthelmintic	
AntiHIV	
Antibacterial	
Anticancer	
Anticariogenic	
Antidiarrheic	
Antidysenteric	
Antihepatotoxic	
Antihypertensive	
Antilipolytic	
Antimutagenic	
Antinephritic	Uchida, U., Ohta, H., Niwa, M., Mori, A., Nonaka, G-i., Nishioka, I., and Zaki, M. 1989. Prolongation of Life Span of Stroke-Prone Spontaneously Hypertensive Rats (SHRSP) Ingesting Persimmon Tannin. <i>Chem. Pharm. Bull.</i> 38(4): 1049-1052, 1990.
Antiofidic	Economic & Medicinal Plant Research, 5: 363.
Antioxidant IC50=1.44 ug/ml	
Antioxidant 1/3 quercetin	
Antiradicular 500 mg/kg/day orl mus	Uchida, U., Ohta, H., Niwa, M., Mori, A., Nonaka, G-i., Nishioka, I., and Zaki, M. 1989. Prolongation of Life Span of Stroke-Prone Spontaneously Hypertensive Rats (SHRSP) Ingesting Persimmon Tannin. <i>Chem. Pharm. Bull.</i> 38(4): 1049-1052, 1990.
Antiradicular 1/3 quercetin	
Antirenitic	Uchida, U., Ohta, H., Niwa, M., Mori, A., Nonaka, G-i., Nishioka, I., and Zaki, M. 1989. Prolongation of Life Span of Stroke-Prone Spontaneously Hypertensive Rats (SHRSP) Ingesting Persimmon Tannin. <i>Chem. Pharm. Bull.</i> 38(4): 1049-1052, 1990.
Antitumor	
Antitumor-Promoter	
Antiulcer	
Antiviral	
Cancer-Preventive	HerbalGram No. 22 - Spring 1990, page 14.
Carcinogenic	
Chelator	
Cyclooxygenase- Inhibitor	
Glucosyl- Transferase-Inhibitor	
Hepatoprotective	
Immunosuppressant	
Lipoxygenase- Inhibitor	
MAO-Inhibitor	
Ornithine- Decarboxylase- Inhibitor	
Pesticide	
Psychotropic	Uchida, U., Ohta, H., Niwa, M., Mori, A., Nonaka, G-i., Nishioka, I., and Zaki, M. 1989. Prolongation of Life Span of Stroke-Prone Spontaneously Hypertensive Rats (SHRSP) Ingesting Persimmon Tannin. <i>Chem. Pharm. Bull.</i> 38(4): 1049-1052, 1990.
Xanthine-Oxidase- Inhibitor	

THEOBROMINE Seed 200.0 400.0 -0.47 *

Activities (21)

Anorexic	Martindale's 28th
Antiasthmatic 10 mg/kg/orl/man	Martindale's 29th
Anticellulitic	
Arteriodilator	
Bronchodilator	Merck 11th Edition
CNS-Stimulant	
Cardiotonic	Merck 11th Edition
Diuretic 300-600 mg/man/day	Martindale's 28th
Emetic	Martindale's 28th
Fetotoxic 100 mg/kg	
Herbicide IC41=100 ppm	Lydon, J. & Duke, S., The potential of pesticides from plants, pp. 1-41 in Craker, L. & Simon, J., eds, Herbs, Spices & Medicinal Plants: Recent Advances in Botany, Horticulture, & Pharmacology, v. 4, Oryx Press, Phoenix, 1989, 267pp.
Myocardiotonic	
Myorelaxant	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
Myostimulant	Martindale's 29th
Pesticide	
Stimulant	
Teratogenic 100 mg/kg	
Vasodilator	Merck 11th Edition
cAMP-Inhibitor IC50=0.06 mg/ml	Schussler, M., Fricke, U., Nikolov, N., and Holzl, J. 1991. Comparison of the Flavonoids Occurring in Crataegus species and Inhibition of 3',5'-Cyclic Adenosine Monophosphate Phosphodiesterase. Plant Medica 57: Suppl Issue 2. p.A-133.
cAMP-Phosphodiesterase-Inhibitor	Pizzorno, J.E. and Murray, M.T. 1985. A Textbook of Natural Medicine. John Bastyr College Publications, Seattle, Washington (Looseleaf).
cGMP-Phosphodiesterase-Inhibitor	Pizzorno, J.E. and Murray, M.T. 1985. A Textbook of Natural Medicine. John Bastyr College Publications, Seattle, Washington (Looseleaf).

THEOPHYLLINE Seed -- 2500.0 0.53 *

Activities (36)

(+)-Inotropic	Bruneton, J. 1999. <i>Pharmacognosy, Phytochemistry, Medicinal Plants</i> . 2nd Ed. Lavoisier Publishing, Paris. 1119 pp.
Allergenic	Martindale's 29th
Antiapneic	Martindale's 29th
Antiasthmatic 5 mg/kg/orl/man	Martindale's 29th
Antibradyarrhythmic	Martindale's 29th
Antibronchitic	
Anticellulitic	
Antidote Charcoal & Propanolol	Martindale's 29th
Antiemphysemic	Martindale's 29th
Antineuronalgic	Martindale's 29th
Antirhininitic	Martindale's 29th
Antispasmodic 100 uM	
Antiviral	
Arteriodilator	
Bronchodilator	
CNS-Stimulant	Jeffery B. Harborne and H. Baxter, eds. 1983. <i>Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants</i> . Taylor & Frost, London. 791 pp.
Cardiovascular 30 mg/kg orl rat	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. <i>Drug Dosage in Laboratory Animals: A Handbook</i> . (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.
Choleretic	
Diuretic 15 mg/kg ivn rbt	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. <i>Drug Dosage in Laboratory Animals: A Handbook</i> . (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.
Fetotoxic 100 mg/kg	
Herbicide IC58=100 ppm	Lydon, J. & Duke, S., The potential of pesticides from plants, pp. 1-41 in Craker, L. & Simon, J., eds, <i>Herbs, Spices & Medicinal Plants: Recent Advances in Botany, Horticulture, & Pharmacology</i> , v. 4, Oryx Press, Phoenix, 1989, 267pp.
Hypertensive	LAWSON in Koch, H. P. and Lawson, L. D., eds. 1996. <i>Garlic- The Science and therapeutic application of Allium sativum L. and related species</i> . Williams & Wilkins, Baltimore. 329 pp.
Hyperuricemic	Martindale's 29th
Hypoglycemic	
Myocardiotonic	Martindale's 29th
Myorelaxant 100 uM	
Pesticide	
Prostaglandin-Secretor 10 mg/kg orl rat	Borchard, R. E., Barnes, C. D., and Eltherton, L. G. 1991. <i>Drug Dosage in Laboratory Animals: A Handbook</i> . (3rd Ed.) The Telford Press, Inc., P. O. Box 287, Caldwell NJ 07006.
Stimulant	
Tachycardic	Martindale's 29th
Teratogenic	CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
Vasodilator	
cAMP-Inhibitor IC50=0.06 mg/ml	Schüssler, M., Fricke, U., Nikolov, N., and Holzl, J. 1991. Comparison of the Flavonoids Occurring in Crataegus species and Inhibition of 3',5'-Cyclic Adenosine Monophosphate Phosphodiesterase. <i>Plant Medica</i> 57: Suppl Issue 2. p.A-133.
cAMP- Phosphodiesterase-Inhibitor	
cGMP-Inhibitor	Pizzorno, J.E. and Murray, M.T. 1985. <i>A Textbook of Natural Medicine</i> . John Bastyr College Publications, Seattle, Washington (Looseleaf).
cGMP- Phosphodiesterase-Inhibitor	Pizzorno, J.E. and Murray, M.T. 1985. <i>A Textbook of Natural Medicine</i> . John Bastyr College Publications, Seattle, Washington (Looseleaf).

TIMBONINE	Seed	--	--	CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
XANTHINE	Seed	--	--	CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses

Activities (1)

Carcinogenic